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REMARKS/ARGUMENTS

Claims 85, 95, and 97 have been amended. New dependent claims 125 and 126 have been added. Specifically, in claim 85, the first instance of the word "region" has been changed to "first region" as suggested by the Examiner. In claims 95 and 97, references to trademarks have been deleted.

New claim 125 is directed to a cationically reactant starch and is supported in the specification, for example, at page 10, lines 18-21. New claim 126 is directed to an anionically reactant starch and is supported in the specification, for example, at page 11, lines 17-19. No new matter has been added. Claims 85-98 and 124-126 are pending.

Petition to Correct Inventorship under 37 C.F.R. 1.48

Applicant respectfully requests reconsideration of the Petition to Correct Inventorship filed October 11, 2001. Applicant hereby submits a substitute declaration of James F. Bredt, Timothy C. Anderson, David B. Russell, Sarah L. Clark, and Matthew DiCologero to replace the previous declaration of James F. Bredt, Timothy C. Anderson, David B. Russell, and Sarah L. Clark and the previous declaration of Matthew DiCologero. The substitute declaration names James F. Bredt, Timothy C. Anderson, David B. Russell, Sarah L. Clark, and Matthew DiCologero, each as "an original first and joint inventor of the subject matter" of this application. The substitute declaration has been signed in two counterparts by all of the co-inventors.

Rejection under 35 U.S.C. 112

Claims 85-98 and 124 were rejected under 35 U.S.C. 112, second paragraph. As noted in the above remarks, independent claim 85 was amended in accordance with the Examiner's suggestion. In claims 95 and 97, all trademarks were deleted. Withdrawal of this rejection is, therefore, respectfully requested.

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Rejection under 35 U.S. C. 102(f)

As noted above, a substitute declaration signed by all co-inventors in two counterparts is included with this response. As such, James F. Brecht, Timothy C. Anderson, David B. Russell, Sarah L. Clark, and Matthew DiCologero are all co-inventors. Withdrawal of this rejection is, therefore, respectfully requested.

Rejection under 35 U.S.C 103(a)

Claims 85-98 and 124 were rejected under 35 U.S.C. 103(a) over WO 98/09798 (Brecht) in view of U.S. Patent No. 5,943,235 (Earl) and at least one of U.S. Patent No. 3,926,870 (Keegen) and U.S. Patent No. 4,476,190 (Clark). This rejection is respectfully traversed.

Brecht discloses a three-dimensional printing material system comprising a mixture of particles of adhesive, a filler, and an activating fluid comprising a solvent that activates the adhesive in the mixture. As noted by the Examiner, Brecht fails to disclose, teach, or suggest a method of three-dimensional printing comprising providing a first layer of a free-flowing particulate material comprising a first reactant and a second reactant, as recited, in part, in independent claim 85.

Earl discloses the process of Selective Deposition Modeling, where material, which is made flowable for dispensing by adding solvent to it, is selectively deposited to form a subsequent object lamina by application of stimulation. (Earl, column 5, line 57 through column 6, line 54.) Earl also discloses a two part epoxy, however, the two part epoxy of Earl is apparently selectively deposited sequentially. The first part of the two part epoxy is selectively deposited, followed by selective deposition of the second part of the two part epoxy. Applicants therefore disagree with the Examiner's assertion that Earl suggests using reactive two component materials simultaneously. Earls fails to disclose, teach or suggest, a method for three dimensional printing, comprising, in part, providing a first layer of a free-flowing particulate

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material comprising a first reactant and a second reactant, but rather teaches providing a first layer of a first reactant and superposing a second layer of a second reactant.

Keegan discloses a denture adhesive preparation containing anionic and cationic materials. Clark discloses an adhesive for prepasted wall coverings containing anionic and cationic material. Both Keegan and Clark fail to disclose a method for selectively activating the ionic adhesives. Moreover, Keegan and Clark each fail to disclose a method for forming a three dimensional printing comprising, in part, providing a first layer of a free-flowing particulate material comprising a first reactant and a second reactant.

One skilled in the art would not have combined Bredt, Earl, and Keegan or Clark in the manner suggested by the Examiner to arrive at the invention as recited in independent claim 85. As noted above, the two part epoxy of Earl is sequentially layered. Because the two components of Earl react upon contact, one skilled in the art would not have combined the two epoxy components of Earl for simultaneous deposition. One skilled in the art would have understood that combining the two part epoxy prior to deposition would have resulted in other problems such as clogged applicators. One skilled in the art would have been motivated to ensure the two components were not in contact with one another prior to deposition. Similarly, one skilled in the art would not have combined the two part epoxy of Earl in the layer of particulate material of Bredt, because the two part epoxy would have become bound throughout the entire layer solidifying the entire layer. Unlike the present invention, the two part epoxy would not be selectively cured and therefore not result in unbounded material surrounding the article. In contrast, by applying the two reactants in the free-flowing layer, the present invention eliminates the need for a subsequent step of curing the material, e.g. by exposing the material to an external energy source or applied stimulus because it is this chemical reaction which causes solidification of the material in the first region. (Present application, page 7, lines 17-22.) The present invention avoids a second sequential application as necessary with the two part epoxy of Earl.

Furthermore, because neither Keegan nor Clark disclose a free-flowing particulate material comprising a first reactant and a second reactant, one skilled in the art would not have been motivated to combine the ionic adhesives of Keegan or Clark with the three-dimensional printing system of Bredt. Moreover, because simultaneous application of two part epoxies are

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not compatible with the selective deposition modeling technique of Earl, one skilled in the art would not have been motivated to combine the ionic adhesives of Keegan or Clark with Earl. In contrast, the first and second reactants of the present invention may be judiciously chosen to cause an instantaneous chemical reaction in the presence of a fluid, which can result in spontaneous hardening in the patterned region. (Present application, page 6, line 33 through page 7, line 2.) One skilled in the art would, therefore, not have been motivated to combine the cited references to apply a first layer of free-flowing particulate material comprising a first reactant and a second reactant, and dispense a fluid onto a first region of the first layer as recited, in part, in independent claim 85.

Moreover, even if Brecht, Earl, Keegan or Clark were combined, the combination would not have resulted in the invention as recited in independent claim 85. The proposed combination of Brecht, Earl and Keegan or Clark teaches a liquid adhesive comprising cationic and ionic species, which would begin to react during deposition, which would not selectively react, and would react throughout the entire layer. Selective deposition would be required as taught by Earl, to produce an arbitrary three dimensional article. The proposed combination would not have resulted in a method of applying a first layer of free-flowing particulate material comprising a first reactant and a second reactant, dispensing a fluid onto a first region of the first layer, and allowing a reaction between the first and second reactants to occur, causing a solidified material to form in the first region, as recited, in part, in independent claim 85. As noted above in the present invention, the first and second reactants in the free-flowing particulate material chemically react to initiate hardening in a region of the desired predetermined pattern.

As such, claim 85 is patentable over these references, either alone, or in combination. Claims 86-98 and 124 depend directly or indirectly from independent claim 85 and are patentable for at least the above mentioned reasons. Withdrawal of this rejection is, therefore, respectfully requested.

Newly presented claims 125 and 126 depend indirectly from independent claim 85 and necessarily include all the limitations of independent claim 85. As such, claims 125 and 126 are patentable over the cited references.

Appln. No. 09/706,350
Amendment dated: December 3, 2003
Reply to Office Action of 9/3/03

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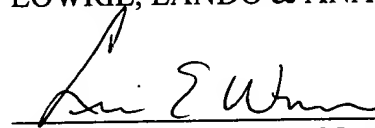
CONCLUSION

In view of the foregoing Amendments and Remarks, this application is in condition for allowance. A notice to this effect is respectfully requested. If the Examiner believes that the application is not in condition for allowance, the Examiner is requested to call Applicant's attorney at the telephone number listed below.

If this response is not considered timely filed and if a request for an extension of time is otherwise absent, Applicant hereby requests any necessary extension of time. If there is a fee occasioned by this response, including an extension fee that is not covered by an enclosed check please charge any deficiency to Deposit Account No. 50/0214.

Respectfully submitted,

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